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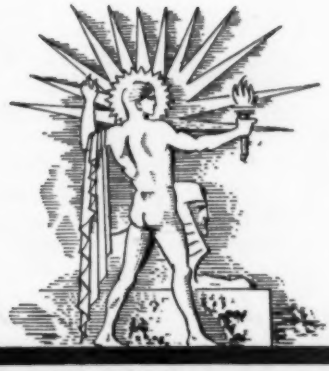
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



December 2, 1939

Beauty From Waste

See Page 358

A SCIENCE SERVICE PUBLICATION

Do You Know?

There are more than 100 types of soil in Florida, says a state experiment station chemist.

The New Mexican hairless cat, exhibited at cat shows 30 years ago, may have become an extinct breed.

Before the World War Germany depended on imports for 20% of her food; now she has reduced this dependence to 18%.

Real topaz is not always yellow: the crystals may range from an almost colorless clarity to red, yellow, brown, green, or blue.

Owners of privately owned trucks who are still allowed to operate them in Germany have been ordered to convert them to consume gas.

That the United States should buy Iceland and Greenland from Denmark was proposed by Secretary Seward after the United States bought Alaska from Russia.

To test wearing qualities of different kinds of wool in Navajo Indian rugs, six rugs have been placed on the floor of a busy corner of the Department of the Interior cafeteria in Washington.

Government engineers are at work in seven states to investigate possible sources of such strategic minerals as chromium, tin, manganese, tungsten, and antimony.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

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PSYCHOLOGY

Can truthful propaganda be effective? p. 367.

The modern homing pigeon is different from the pigeon used by the Greeks to release names of Olympic game winners.

Rich resources of gas with high content of helium are reported to have been found in the Greater Donetz Coal Basin of southern Russia.

Arsenals and Federal munition depots in the United States are rated capable of producing only 10% of the war materials for an emergency; the other 90% would have to be produced by civilian industrial plants.

Pelicans in the London Zoo are being taught to eat a meat diet instead of their accustomed fish, due to wartime shortages.

Regardless of the kind of feeding given, about one newborn baby in three will lose five to eight per cent. of birth weight in first two weeks of life, a Chicago physician reports.

More than half the cases of fractured spines are not accompanied by paralysis, and with adequate treatment most patients may recover and return to normal life, says a Birmingham physician.

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MEDICINE

Discover How and Where Body Makes Its Germ-Fighters

Antigens Marked With Dye Protein Came To Rest in Blood Vessels in Liver, Spleen and Bone Marrow

DISCOVERY of where and how the body makes its disease-fighting antibodies was announced by Dr. Florence R. Sabin, of Denver, at the meeting of the Southern Medical Association in Memphis.

Resistance to disease depends on the possession of these antibodies in the blood which are active against the specific disease germ or its poisons. These antibodies are best induced by repeated small injections of antigen, which may be either disease germs or their poisons.

"Marked antigens," made with the use of dye-protein synthesized by Dr. Michael Heidelberger, of Columbia University, were used in Dr. Sabin's studies to locate the site of antibody formation.

When she injected these dye proteins or marked antigens into an animal's body, she was able to discover particles of them in the cells that line the blood vessels in the liver, spleen and bone marrow and in certain other parts of the body. These cells are the scavenger cells of the body. They are part of the reticulo-endothelial system which had already been suspected of being the body's antibody factory.

Finding the marked antigen particles in these cells clinched the matter of where the antibodies are formed. A few days after the marked antigen particles were located, and at the time antibodies were appearing in the blood, the scavenger cells no longer showed any dye-protein and exhibited a considerable pinching off of their surface films. This suggests, Dr. Sabin reported, that after engulfing the antigen from the disease germ, the scavenger cells synthesize a chemical called globulin, part of which is modified into antibody globulin. Then through a sacrifice of part of their protoplasm, these globulins are given to the blood. This part of the research seems to explain how the antibodies are formed.

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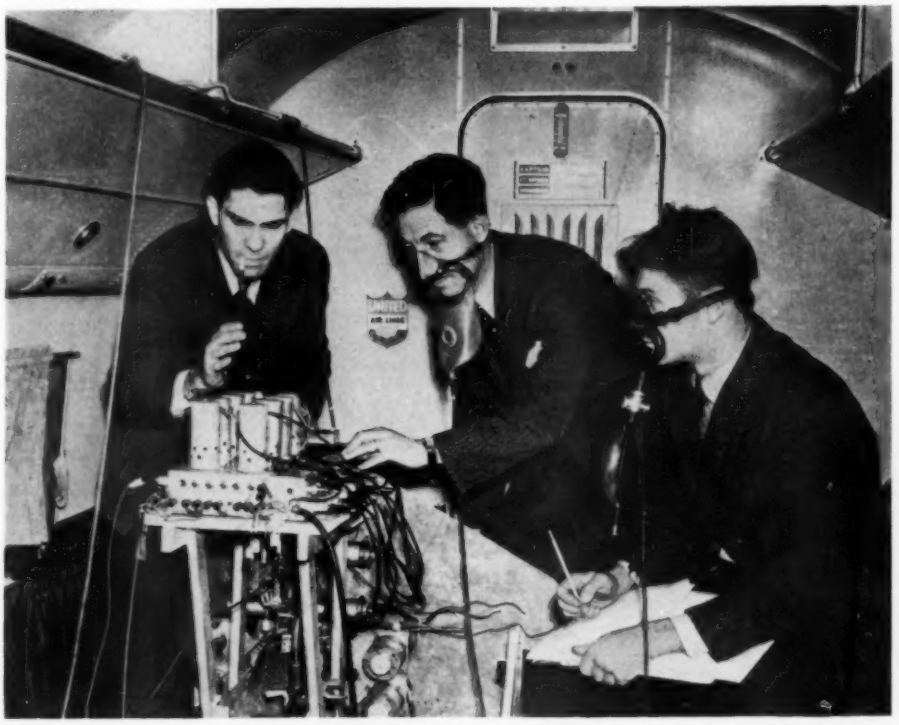

FOR SCIENCE

At an altitude of 28,900 feet, scientists must work in oxygen masks. Wilfred Davies, United Air Lines research engineer (left), Dr. Gerhardt Herzog, Zurich physicist and Winston Bostick (right), of the University of Chicago, are photographing cosmic rays.

Rare Skin Disease

THE long-unsettled question of whether Kaposi's disease, rare skin malady, was due to cancer or a germ has apparently been settled by studies reported by Drs. Roger M. Choisser and Elizabeth M. Ramsey, of George Washington University School of Medicine.

The disease, characterized by acute swellings and peculiar eruption, is a malignant tumor, Dr. Ramsey stated. The conclusion was reached from the facts that: it was impossible to find a causative germ or virus; the disease could not be produced in animals by injecting material from human patients; and the microscopic appearance of the tissues and the invasive nature of the disease were like that of cancer.

Science News Letter, December 2, 1939

Desensitizing for Ivy

A METHOD of desensitizing persons susceptible to ivy poisoning so they will escape attacks if they should come in contact with the plant was announced by Dr. Bedford Shelmire, of Dallas, Texas.

The method consists in giving a "shock dose" of poison ivy oleoresin in gelatin capsules. For three to 12 days after swallowing these capsules, the patients had flare-ups of itching and eruption. These were in no way like the skin irritation that follows contact with the plant. They were like the irritation that sometimes follows medicine to which a person is sensitive.

One week after the skin symptoms disappeared, five of the 19 patients who got the shock dose were given the same or double the dose of poison ivy in capsules. Not one of these had a single flare-up of the skin irritation. All 19 had previously had ivy poisoning and all had shown they were susceptible when a bit of the poison ivy oleoresin was applied to their skin. After the second big dose, the skin tests showed marked decrease in skin sensitivity to poison ivy. How long this period of desensitization will last has not yet been determined.

The possibility of desensitizing pa-

tients to poison ivy is also shown, Dr. Shelmire pointed out, by the fact that while about half the young adults in the vicinity of Dallas, where the poison ivy shrub and vine are abundant, are sensitive to the plant, very few aged persons are sensitive to it as shown by the skin tests. Apparently the older persons lose their sensitivity to poison ivy if they avoid the plant for long periods.

Desensitization to other plants which may cause skin trouble in sensitive persons was accomplished by small, gradually increasing doses of the plant oleoresins. The material is given in corn oil, and put into capsules before swallowing to avoid irritation of lips and mouth.

Desensitization in the case of hay fever patients is usually done by injections of pollen extract. The injection method was not practical for those patients who got skin troubles from handling plants, flowers and weeds, so Dr. Shelmire worked out the oral method.

Common vegetables and fruits, such as spinach, tomatoes, radishes, mustard, turnips, corn, Irish potatoes, water cress, carrots, oranges, lemons, grapes and figs, Dr. Shelmire reported, may cause the skin irritation, called contact dermatitis, when these fruits and vegetables are handled. Housewives, cooks, gardeners, and florists are most likely to be affected.

Science News Letter, December 2, 1939

Patients "On the Wagon"

A BLOW on the head is not to be recommended as treatment for alcoholism, but it proves effective, Dr. James Greenwood, Jr., of Houston, Texas, discovered in checking after-effects of head injury in 118 patients.

Alcohol so greatly increases the headaches, convulsions and other after-effects that one-half of the patients who used alcohol before their injury voluntarily discontinued drinking.

More important was the finding that if a patient does not recover completely within two years after the injury, his chances of getting entirely well are "exceedingly small." In the group of severe head injuries, 71% of those who lived recovered completely.

Most frequent symptom complained of among the after-effects was headache, which was not much less frequent five years after the injury than at the end of one year. There was some improvement in dizziness and in the ability to stand exertion, nervousness, fatigue, visual disturbance and irritability. Discomfort due to sunlight and working in hot weather improved markedly, only 5% of the patients suffering this five years after the injury.

Neurotic symptoms appear over three times as often in compensation cases as in non-compensation cases. Fear of returning to a dangerous occupation probably accounts for some of this.

About 90% of the convulsive seizures which follow head injury begin after two years. More than half of the patients had their convulsions well enough controlled, however, to be steadily employed or to keep up with their school work.

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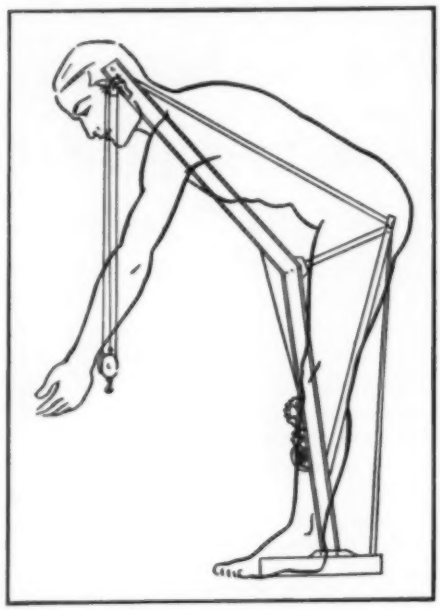

HUMAN CRANE

A man lifting a heavy object obeys almost the same mechanical laws as may be applied to a crane or derrick. Mathematical formulae can be used to determine interference with function of a back injury.

Engineering Principles

THE MATHEMATICS and physics used by construction engineers can be used by bone and joint surgeons to determine disability following injury, Dr. Earl D. McBride, of Oklahoma University School of Medicine, declared.

The action of the body with its arms and legs is strikingly similar to that of a crane or derrick, Dr. McBride pointed out.

"Almost the exact mathematical and mechanical laws may be applied to a man lifting an object such as a heavy weight off the floor as would be applied to a crane," he said. "If the hips become stiff or if the back is injured and out of alignment, then it is necessary to determine the extent of interference of true mechanical action by means of mathematical formula similar to that which would be applied to alteration of the structural supports to a crane and its pulleys."

Dr. McBride showed how an engineer's estimate might be made of a bow-leg or knock-knee condition.

"In a man weighing approximately 160 pounds," he said, "the additional stress at the center of an angulation or curve one inch out of line of the plumb center would be about 500% increase. When a leg is broken and healed in a deformed state which causes the man to walk with his knee flexed at 60 degrees, the burden of weight on the knee is double the weight of his body. Such a condition will cause a disabled person of this type to spend much greater energy in his effort to use the limb."

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Hay Fever Relieved

RELIEF of hay fever and asthma symptoms by daily doses of potassium, and the theory that adrenal gland disorder is responsible for such conditions of hypersensitivity, were announced by Dr. Francis P. Parker, of Emory University, Georgia.

More than half of Dr. Parker's group of 35 allergic patients got complete or almost complete relief from their asthma and hay fever. Another 12% were relieved as much as 50% and 12% showed slight improvement. The potassium treatment did not benefit patients whose allergy took the form of skin disturbance or eczema.

No poisonous effects from the large daily doses of either potassium chloride or potassium gluconate were seen in any of the patients. The patients had to continue taking the daily doses of potassium to remain free of symptoms or hold their improvement.

These findings are in line with those of other doctors who have tried potassium for hay fever and asthma, but Dr. Parker went a step farther, searching for the reason why potassium proved effective. His blood tests of normal and allergic patients before and during potassium treatment led to the adrenal gland theory of the cause of hay fever and asthma.

Patients getting most relief of symptoms had the smallest increase of the amount of potassium in their blood. This probably shows that the potassium succeeded in going from the blood into the tissues where, Dr. Parker explained, it probably must go in order to afford the patient any relief.

Hay fever and asthma patients, the studies suggest, owe their sneezing and sniffling and breathlessness to having too little potassium in their tissues. The lack or deficiency of potassium, however, is probably a secondary result of some disorder elsewhere in the body. Disease or dysfunction of the adrenal glands, which are known to be largely responsible for potassium distribution throughout the body, is probably the underlying cause of such allergic conditions as hay fever and asthma.

Science News Letter, December 2, 1939

Early Cancer Diagnosis

A SIMPLE chemical test for early diagnosis of one kind of cancer in women is now available and should be part of the routine examination of the pelvis, Dr. Charles E. Galloway, of Evanston, Ill., told the meeting.

The test, devised by Dr. Walter Schiller, now chief pathologist at Cook County Hospital, Chicago, is for detecting cancers at the mouth of the womb, which make up about 75% of all cancers of the pelvis in women. It is very simple and is performed by painting the area with a water solution of iodine. If the area is healthy, it turns brown. If cancer is present, however, the painted area turns yellow or white.

The test depends on the fact that cancer cells do not contain glycogen, which is shown by their failure to stain with iodine. Loss of glycogen is one of the first changes to appear in the skin covering the mouth of the womb when cancer occurs at that location.

Other conditions exist which may also show up with this test and these peculiar forewarnings, Dr. Galloway pointed out, may be the forewarnings of the onset of cancer many years later.

Much earlier diagnosis of cancer, with consequent better results from treatment by X-rays, radium or surgery, will result, Dr. Galloway believes, if this test and examination of the area are made once or twice a year. For visual examination of the area, he pointed out, doctors now have an instrument, called the colposcope, which enables them to see the tissues and detect changes in them.

Science News Letter, December 2, 1939

Plans are being made to restore Atlantic salmon to suitable coastal rivers in New England.

Need for soil conservation in America was recognized by George Washington and other land owners of Colonial days.

ASTRONOMY

New Method of Testing Large Telescope Mirrors

Discovery by Argentine Astrophysicist Permits Astronomers To Test Disks Continually in Grinding

A NEW WAY of testing the accuracy of grinding for giant telescope mirrors, that saves two-thirds of the cost, labor and time necessary for this vital operation, has been developed by Dr. Enrique Gaviola, Argentine astrophysicist of the National Observatory at Cordoba.

The discovery, believed one of the most important in the century in the construction of telescope mirrors, allows a parabolic surface to be ground on a great glass disk directly and tested continually during the grinding.

For years astronomers have been grinding parabolic mirrors in a three-stage, tedious and costly process.

From their original flat disk, as made in a glass works, they grind a spherical concave surface. Next they take another piece of glass and grind it to an optically flat surface. And finally they use the "flat" to test the spherical surface as they slowly grind and figure it into the desired parabola.

"The amount of work, time and money necessary for this three-stage operation," says Dr. Gaviola, "is about three times the amount demanded by the parabolic mirror itself.

"All three surfaces have to be figured, tested and corrected independently and the optical flat has to be ground more accurately than the accuracy expected in the final parabolic mirror."

Dr. Gaviola, in a recent visit to the laboratories of the Mt. Palomar Observatory, where the great 200-inch diameter mirror has been in the process of grinding since 1936, explained the methods to astronomers there.

They praised its ingenuity but explained that they are so far advanced in their grinding, by time-tried methods, that they will continue to construct their mirror along the routine lines. At the most optimistic estimate it may be completed next year.

If the method had been available and proved successful five years ago, the Mt. Palomar mirror might now be in service and the giant telescope could have been constructed at a much lower cost.

Dr. Gaviola was led to the discovery of the new method, which uses a fine wire instead of a knife edge for testing, by sheer necessity.

In 1936 while at La Plata Observatory in Argentina he set to work to correct noticeable errors in the 82-centimeter Cassegrain mirror at the observatory.

"As we had no plane mirror of that size and no possibility of making either a flat or a Hindle spherical of 82-centimeter (over 2.7 feet) diameter it became necessary to find a new, simple method of testing the Cassegrain using only the available equipment. After some experiments a satisfactory method was devised," Dr. Gaviola explains.

As described in a joint report with Ricardo Platzeck of La Plata Observatory to the *Journal of the Optical Society of America,* Dr. Gaviola says the new testing method works on the basic idea that to test an optical surface an arrangement is needed that will form an image of some kind. If the image is good, a study of it tells the quality of the optical surface.

If the image is not good, as it naturally will not be in a new mirror just being ground, it is subdivided into a number of good images by decomposing the main optical surface into sufficiently small parts or zones by the use of screens. The image is usually a so-called "artificial star," a bright point of light, or light from a narrow silt.

The common method is to observe the diffraction of light reflected off the telescope mirror as it passes by a sharp knife edge. The disadvantage of a knife edge, says Dr. Gaviola, is that it does not give a symmetrical diffraction pattern. Systematic errors can easily be committed.

To overcome this handicap, the new method uses a fine wire as the diffracting object and the diffraction pattern is symmetrical on each side of it.

The diffraction pattern from the various zones of the telescope mirror (secured by suitable screens with carefully cut holes in them) are observed. From these observations the curve of the mir-

ror surface can be calculated and the "high" or "low" spots, lying outside permissible accuracy can be ascertained.

It is possible to obtain accuracy only 1/100 the wavelength of light by the method, which is not only applicable to parabolic mirrors but to optical surfaces which depart considerably from a spherical shape. These forms, Dr. Gaviola states, have been avoided up to now for it is a rule of optical shops that "a surface can be figured as accurately and only as accurately as it can be tested."

Science News Letter, December 2, 1939

PALEONTOLOGY

Coal Mine Waste Piles Yield Beautiful Fossil Leaves

See Front Cover

BEAUTY is sought and found in about the unlikeliest of all imaginable places — the waste-heaps of soft coal mines—by George Langford of Joliet, Ill. For him it is not a profession but an absorbing avocation, for Mr. Langford makes his living as manager of a manufacturing plant in Joliet. His spare time he spends botanizing the forests of 250 million years ago, as represented by the fossil leaf-remains embedded in the nodules of hardened clay cast out with the shaly waste from the coal pits of central Illinois.

Finding fine leaf-imprints in shale nodules is not particularly new in itself. Thousands of them are in geological museums and private collections everywhere. The real contribution of Mr. Langford is the method he has developed for bringing out their full color and beauty, something not accomplished by the kind of handling hitherto employed. Leaf-forms that ordinarily show dull and colorless take on almost the sheen of living flowers.

A shale nodule is a more or less elongated oval lump of stuff that looks like hardened clay. Indeed it *is* hardened clay, solidified around a leaf, or twig, or insect, or other object that fell into the mud and became embedded there, ages ago when coal was in the making. If you turn it edgewise and give it a sharp rap with a hammer it will split apart, showing the convex or positive side of the leaf-print on the face of one of the halves and the concave or negative side on the other.

That is all that has been done with leaf-nodules hitherto—just split them open to show the contents. But in that state the leaf-prints are dull and rather uninteresting, due to their being covered with tightly sticking tiny mineral particles—literally the dust of ages.

Mr. Langford undertook to get rid of this millenial dust. His technique is something between a jeweler's and a dentist's. He uses the small, keenly pointed and edged tools of a dentist, plus a variety of brushes, to dislodge the mineral particles, and then carefully burnishes each small detail of the cleaned-up design by hand. No buffing wheel, however fine, is permitted to touch one of his precious specimens.

Most people, when they first see a Langford leaf-nodule preparation, imagine that it has been painted or enameled. This is not the case. No artificial color of any kind is added, no varnish, no shellac. A little colorless burnishing fluid is the only aid he employs. The colors are those latent in the minerals composing the specimen itself.

Mr. Langford states: "The stone of the strip mine nodules is very variable. All of it contains more or less iron. In some places it is a buff-colored and rather soft shale. Occasionally it is sandstone. The stone best suited for fossil preservation is very close-grained and hard, in varying shades of fawn, gray, light blue and dark blue.

"Weathering converts the iron content into oxide, producing red, which, combining with the stone colors, results in orange, brown, purple and other colors. It remained for us to develop these colors by accentuating them in the plants and suppressing them in the surrounding stone. The result is a fine reproduction of the plant in color, and of surprisingly lifelike appearance."

The plant remains brought out by Mr. Langford's method are almost all leaves of ferns and fern-like plants, which were the highest forms of vegetation on the earth during the coal age. Higher flowering plants did not appear until much later. It is in the leaves, therefore, their delicate venation and smooth surface texture, that the greatest possible development of beauty must be sought.

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PHYSICS

"Magnetic" Mines Feasible, Say American Experts

FLOATING mines exploded by the changes in magnetic field, due to the near presence of an iron ship's hull, may be the new factor in renewed attacks by Germany against Allied and neutral shipping.

Accepting British press stories of "magnetic" mines as plausible, government and naval scientists in the United States privately speculated on how they work. Without much difficulty, they believe, it should be possible to create a firing mechanism for floating mines that would be set off by slight changes in magnetic field as an iron-hulled ship passed close by. Only when the ship was close—and hence vulnerable—would these mines go off. There would be explosion at farther distances at which the mines would be harmless. And yet they would not have to make actual contact with the ship as do ordinary mines.

Dropping small mines from an airplane, as reported, is perfectly feasible and would be no different than dropping torpedoes from planes, as is now done. The only thing required would be explosives which are not set off by a jarring impact.

Press reports of magnetic mines that would be attracted directly to the iron hull of a ship with Machiavellian deadliness can be ruled out, say the scientists, unless Nazi ingenuity has succeeded in circumventing the rigid, fixed and well-known laws of magnetic attraction.

Basic trouble with this scheme is that magnetic attraction decreases inversely as the square of the distance so that any magnetic force at ten feet is only one one-hundredth of that at one foot. At twenty feet the attractive force would be only one four-hundredth, and so on.

It is pointed out that even if very intense magnetic fields could be created in a mine by highly magnetic alloys, or possibly by a compact electromagnet inside the mine, the mere presence of this potent field would make it extremely easy to detect such mines lying on the bottom or floating beneath the surface. There are many detecting devices, such as those used in geophysical prospecting, which could do this.

The idea of a magnetic firing mechanism is something else, however, and might explain the sinking of mine sweepers recently. Their iron hulls could set off such magnetic mines under the hull before the "sweeps" could gather them.

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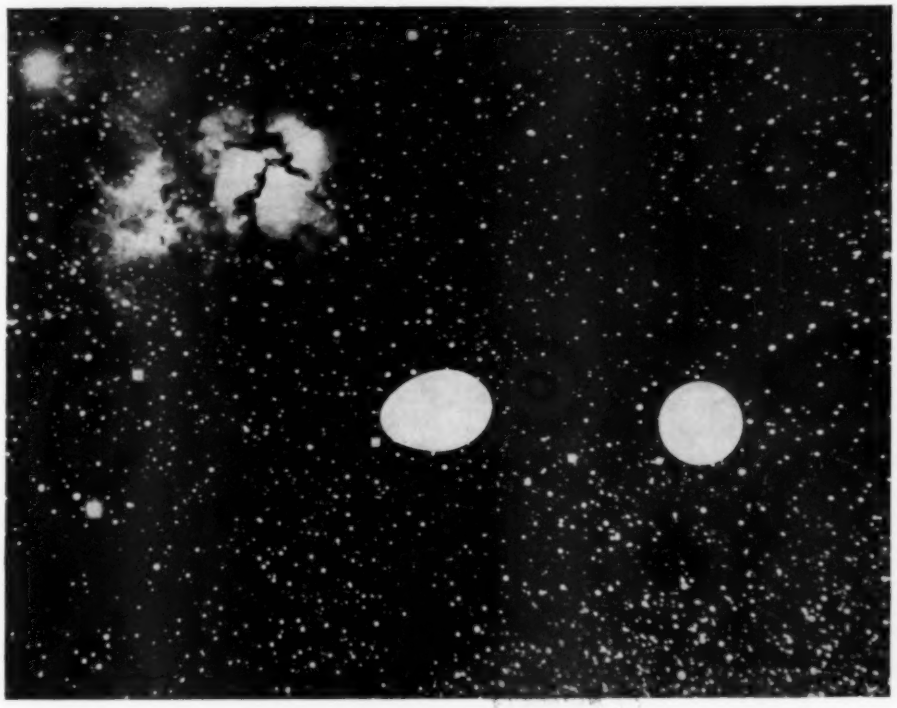

EGG-SHAPED STAR

With the aid of trick photography take a mental ride out into space to have an imaginary look at the largest known star, Mira. Mira is egg-shaped, according to a new hypothesis. As it rotates an observer on earth sees it first broadside, as at the left. Then Mira's light is nearly as bright as the brightest star in the Big Dipper. As it turns the observer then sees it end on as at the right and its brightness dims greatly. Science Service Photographer Fremont Davis made the above montage by taking pictures of common eggs and superimposed his negative on that of a typical picture of the sky as seen with a large telescope.

ASTRONOMY

Mystery Star's Light Varies Because of Hidden Companion

Dark Attendant on Largest Known Star, Mira, May Raise Tides That Are 30,000,000 Miles in Height

By PROF. WILLIAM A. LUBY

Dept. of Mathematics, University of Kansas City

MIRA, the largest star known to astronomers, 125,000,000 times as large as the sun but only ten times as heavy, is still one of the most mysterious of all although its existence has been known since Fabricius of Holland discovered it on August 16, 1596.

The reason is that Mira is a variable star which, every 331.6 days on the average, changes in brightness some 600 fold. At times Mira is as bright as the brightest star of the Big Dipper. At its faintest it cannot be seen without a telescope.

How Mira can undergo any internal disturbance which would make its brightness change by a factor of 600 every 331 days is impossible to conceive. In a recent number of the *Journal of The Royal Astronomical Society of Canada* the writer has given an explanation of this baffling periodic light variation in terms of a dark, smaller, and invisible companion star of Mira which agrees well with observational facts.

While the companion has not been seen one can picture it linked to Mira in orbital motion. The effects of gravity of this companion star would raise enormous tides on Mira that would make it an egg-shaped body. When seen end on from the earth egg-shaped Mira would be faint. When viewed broadside Mira would be at its brightest.

Spectroscopic observations show that at its maximum brilliance the star, or its atmosphere, is receding from the earth and at minimum the star is approaching. To account for this motion a tidal wave on Mira 30,000,000 to 40,000,000 miles high would be required. This may seem enormous but is really less than a tenth of the star's diameter of 432,000,000 miles.

By Kepler's third law and the law of the conservation of momentum it is possible to calculate the velocity and mass of Mira's dark companion. The companion star turns out to be about 73 times as massive as the planet Jupiter, and Mira itself is about 81 times as massive as its companion.

It seems certain that the period of Mira in its orbit is just twice the period of the swings in brilliance of its light. This makes the orbital period 633.2 days and would produce two maxima and two minima in light intensity in one orbital period.

Astronomers now have observations for the last 14 maxima of Mira. On examining these it is found that on seven occasions the star was moving toward the earth in its orbit and the other seven times was moving away in strict agreement with the 633 day period.

While Mira's maximum brightness comes, on the average, every 331 days, there is a variation of 15 days either way. How this can occur is one of the most difficult things of all to explain.

It is probable that the center of gravity of Mira is not a fixed point within the star, but keeps shifting with the position and height of the tide on its surface. It can be easily shown that the tide on Mira nearest its dark companion is great compared with the tide on the far side of Mira.

Because Mira is not rigid, but a tenuous and mobile body, its center of gravity is continually displaced toward the side of the highest tide. This steady displacement would continually change the distance between Mira and its companion. The effect of this is that the period of motion of Mira and its companion would not be constant but would vary within small limits.

There are some 1,100 long-period variable stars known to astronomy. If this explanation of the variability of Mira is accepted it will hold also for these other stars which show like velocity and light changes.

ORNITHOLOGY

Horned, Turkey-Like Bird Found In South America

A TURKEY-LIKE bird with a three-inch horn growing out of its forehead, which was discovered in the jungles of Bolivia, was announced by James Bond and Rodolphe Meyer de Schauensee, curators of Birds of the Academy of Natural Sciences of Philadelphia. They call it the unicorn bird; *Pauxi unicornis,* to the scientist.

The bird resembles the new streamlined Thanksgiving bird which was recently developed by the Department of Agriculture, in its size, which is about eight to 10 pounds in weight. The horn which suggested its name is grayish-blue, while the feathers on the nape of the neck and back of the head are tightly curled and shiny.

The new species was discovered by a collector for the Academy. Mr. de Schauensee, in announcing the finding of the unicorn bird, said, "The mystery surrounding this turkey-like bird is great, particularly in view of the fact that it is edible. Few edible birds escape the natives of a South American jungle. That it should have remained unknown in a relatively well-explored portion of the country is additionally strange."

Science News Letter, December 2, 1939

MEDICINE

New Instrument For Giving Sex Hormone Pills

A NEW instrument for depositing "banks" of male sex hormone within the body in a painless injection in the doctor's office without need for surgical operation is described by Drs. Samuel A. Vest, of Charlottesville, Va., and John E. Howard, of Baltimore (*Journal, American Medical Association,* Nov. 18).

"Hormone banks" are the latest method of supplying sex or other gland products to patients lacking a supply of their own. Young men cheated of manhood by a mistake of nature have been given virility by this method, and Addison's disease sufferers have been restored to healthy, normal lives by it.

Instead of injecting a fluid preparation of the hormone, solid pellets of the material have been buried beneath the skin by surgical operation. The pellets form "hormone banks" on which the body may draw as the material is needed. Several months' supply can be given at one time. Injections of the hormone solution had to be given repeatedly and often, sometimes every day in Addison's disease, because not so much could be given at one time and because the material was rapidly dissipated.

The new instrument now makes even the surgical operation unnecessary. In the doctor's office, a wheal is made in the patient's skin by a local anesthetic. The injector instrument, containing the desired supply of hormone pellets, is pushed painlessly through the skin. The pellets or pills are ejected from the instrument, which is then withdrawn. The puncture wound is closed with a silver clip, but Drs. Vest and Howard say this may not be necessary, as the hole is so small it would probably close by itself.

The instrument, developed with the aid of Frederick C. Wappler, of the American Cystoscope Makers, Inc., might, Drs. Vest and Howard suggest, be used for injection of other solid medicinal materials.

Science News Letter, December 2, 1939

MEDICINE

Surgery Saves Lives Of Those With Lung Cancer

THE healing knife cuts on, saving lives. Cancer of the lung, impossible to cure a few years ago, with modern methods of diagnosis can be operated on with only 10% mortality, X-ray and bronchoscope assisting, provided the tumor is not too advanced. But the unhappy fact is that 80% of the cases get to the surgeon too late.

The whole lung is removed, an operation performed by Dr. Evarts A. Graham, professor of surgery of Washington University, St. Louis, 40 times for lung cancer and many other times for noncancerous conditions—probably performed several hundred times all over the world. The first lung was removed in 1933. The patient was a doctor who is now perfectly well.

About one out of ten of all cancers are in lungs and are most common in middle-aged men. They nearly always arise in bronchial tube. Characteristic symptoms: persistent cough, feeling of tightness or pain in chest, bloody sputum.

Another striking surgical advance reported by Dr. Graham in delivering this year's oration on surgery before the American College of Surgeons: Benign, non-malignant, tumors can be removed from the chest with only 10% mortality and no chest deformity, not even a rib removed. The scar is invisible and the operation undetected even by X-ray after a few years.

Science News Letter, December 2, 1939

IN SCIEN

GENERAL SCIENCE

British Scientists Ask More Scientific News

ALL is not serene under cloak of the British censorship so far as scientific information is concerned. In England as in America there are many scientists who feel that the public should be given information on scientific advances as they happen. Because science is important in war, some scientific research is kept secret in any country. This is particularly the case in a country at war. But the feeling is expressed in a leading article in the British science journal, *Nature* (Oct. 14), that the Ministry of Information (the British censorship) is alone among government departments in not having a special organization from which scientific advice, scientific criticism and scientific fact can be obtained. The science of a scientific war is "not all so secret or so unintelligible that it cannot usefully be made public." The danger is that the censor, not understanding science, will refuse to pass anything scientific for fear of giving aid to the enemy.

Science News Letter, December 2, 1939

ENGINEERING

You Could Get 450 Miles to the Gallon If—

LATEST gasoline dream told at the American Petroleum Institute, Chicago meeting: Any gasoline is sufficiently powerful to propel a car 450 miles to the gallon, if—and the IF must be very, very big—there were no power losses through friction, heat radiation, wind resistance, and other such factors . . . if roads were perfectly level.

One gallon of gasoline contains 99,000,000 foot-pounds of energy. It is impossible to eliminate all power losses in the gasoline engine and vehicle, as impossible as to smooth out all the ups-and-downs on the surface of the earth. Most of us will zip along on less than 20 miles per gallon, certainly not more than a tenth of that 450 miles per gallon. Doubtless the sellers of gasoline would not be too happy if the miles per gallon increased too much.

Science News Letter, December 2, 1939

NCE FIELDS

ENGINEERING

Illuminating Gas May Run British Automobiles

ORDINARY illuminating gas will soon be running many British automobiles according to plans now underway. Gasoline (petrol to Englishmen) is scarce. It is perfectly practical, although not convenient, to use gas fuel in an automobile internal combustion engine. (*Nature,* Oct. 7.)

In place of carburetor, gas is piped through a needle valve and mixed with 6 to 10 volumes of air as it enters the cylinders. Large and cumbersome bags of gas are carried on the roof of the car. Filling stations would sells bags of gas instead of gallons of gasoline. The idea is not new. It was used in England during the World War and has been used since in other countries.

Science News Letter, December 2, 1939

PUBLIC HEALTH

Government Makes Loan In "Stable Currency"

THE FEDERAL government has just made first shipments on loans which will not depreciate significantly as centuries pass by, although its monetary value is less than $200,000.

The loan consists of radium, eight grams of which are going out from the National Cancer Institute in Washington, D. C., to hospitals and medical schools to help in the fight against cancer. But in the year 3629 A. D. these institutions between them should have four grams of radium, if the institutions themselves are still in existence, if they are still using radium to treat cancer patients, and the radium has not been lost or stolen. For radium does not get used up as do medicines and does not wear out as does mechanical equipment. It goes on emitting its powerful, cancer-healing rays continuously, and after 1690 years it still has one-half its potency left.

Shipments of radium have already been made to the Medical College of Virginia, at Richmond, to the Albany, N. Y., Medical College, and to the Misericordia Hospital, at Philadelphia, Dr. Thomas Parran, Surgeon General of the U. S. Public Health Service, announced. Other shipments will be made later. The National Cancer Institute will keep one and one-half grams of its supply for research and for treatment at the cancer clinic of the U. S. Marine Hospital in Baltimore.

Science News Letter, December 2, 1939

BIOLOGY

Grain Rust Fungi May Be Able to Capture Nitrogen

RUST FUNGI, among the worst parasitic enemies of wheat and other grains, may possibly give their host plants something in exchange for what they take. Dr. Branquinho d'Oliveira, of the National Agronomic Station, Lisbon, Portugal, reports (*Nature,* Sept. 9), the results of experiments suggesting that rusts can capture and fix nitrogen from the air, as do the bacteria that live in the roots of plants of the pea and clover family.

Dr. d'Oliveira grew wheat seedlings on laboratory media from which all nitrogen had been carefully excluded, so that the customary supply of this vitally necessary element could not be obtained through the roots. Then he inoculated part of the plants with spores of various species of rust.

After a time he analyzed the plants. The infected ones proved to have a slightly but definitely larger nitrogen content than the control plants that had grown up free from rust.

Science News Letter, December 2, 1939

CHEMISTRY

Survey Use of Wood As Fuel for Motor Vehicles

CANADA has just conducted an extensive survey of wood and charcoal as fuels for motor vehicles. Cheap wood, and the charcoal made from it, has been used in France, Germany and Italy for driving trucks. France has 4,400 such vehicles, Germany and Italy about 2,000 each. England has some but relatively few. While the Italian and French governments have encouraged wood-gas-burning vehicles, the Canadian National Research Council finding is that use of such vehicles in Germany will be restricted by Germany's necessity of importing wood. Italy cannot produce charcoal enough to drive more than 6,000 wood-gas burners.

Science News Letter, December 2, 1939

BOTANY

Short Radio Waves Reduce Growth of Corn Seedlings

RADIO WAVES, sometimes alleged to have a stimulating effect on plant growth, were proved to produce a directly opposite effect, in experiments performed at the California Institute of Technology by a team consisting of a biologist, Dr. J. van Overbeek, and two physicists, Drs. L. Reed Brantley and G. W. Potapenko.

Corn seedlings, germinated in wet sand, were exposed to strong doses of 2½-meter radio waves for periods of 20 to 30 seconds and then re-planted. Marked stunting of stem growth resulted. Exposures of a minute or over inflicted mortal injury to the tops.

Earlier experiments by Dr. van Overbeek had shown that heating had similar stunting effects, traceable to destruction of auxin, the growth-promoting substance. It was therefore concluded that the short radio waves caused an internal heating of the plant tissues.

Confirmation of this view was obtained when outside application of a growth-promoting substance restored both heated and rayed plants to normal growth in a similar manner.

The experiments are described in *Science,* Nov. 17.

Science News Letter, December 2, 1939

BIOLOGY

Egg "Germ" And White Differ in Potential

MEASURABLE differences in electrical potential exist between the developing embryo, or "germ-spot," in an egg and the surrounding albumen or "white," it has been demonstrated in experiments by Drs. Alexis L. Romanoff and Casper L. Cottrell at Cornell University. (*Science,* Nov. 17)

Electrodes were touched to the top of the yolk, at varying distances from the embryo, at intervals of 8, 12, 16 and 24 hours after the commencement of incubation. The longer the incubation the greater the potential difference. Fresh eggs showed a difference of not quite a millivolt; after 24 hours the difference had risen to 7.5 millivolts. Fresh infertile eggs showed practically no potential difference.

Measurements were all made after careful removal of the shell. Earlier researches by other workers, using eggs still in the shell, had given somewhat equivocal results.

Science News Letter, December 2, 1939

POPULATION

Census Stages Rehearsal

Uncle Sam's 1940 Event Will Be Biggest and Best; Preview in Indiana Went Off Without a Hitch

By EMILY C. DAVIS

TAKING a psychological tip from Broadway's theatrical world, Census Bureau officials are doubly on the alert these days, as they push to completion ambitious plans for the 1940 census.

It's to be bigger and better than ever —the sixteenth United States census. And it has brand new features. So, the Bureau had the bright idea of staging a trial census in a couple of Indiana counties in August.

And now, officials are in the pleased but baffled state of a theatrical producer whose dress rehearsal has run off so smoothly that he had no chance to detect snags likely to occur in the real performance. In show business that means, be extra careful about everything; and the Census Bureau is taking heed.

But the public can relax, if the government can't. After all, no United States census has ever been a flop, and thinking of everything in advance is a Census Bureau specialty.

"Ma—the census man's here!" won't be heard in American homes until April 1940. But what the population enumerator will ask you is now pretty well decided.

You won't have to report that you can read and write. Few Americans are illiterate nowadays. Instead, the enumerator will inquire the last grade in school you attended, which provides far more specific and significant information.

Where Were You?

You will have to think back, and tell the enumerator where you lived five years ago. That answer obtained in every home in the country will show how much of the population is moving from south to north, out of dust bowl areas and into which states, from farm to city and from city to suburban village. There are trends in this country, but without a nationwide query, business men and governmental and other agencies can see only part of the picture.

And now comes a question that the Census Bureau felt must be asked, but it was uneasy as to whether Americans could take it. The most serious problems in America are economic. The country has made tremendous strides in health and education, but unemployment of millions is still faced as a giant question mark. The Census Bureau took a long breath and decided to ask American people about their wages and salaries.

To the Bureau's pleasant surprise, few people in the trial census this summer objected to telling what they earned in twelve months preceding. The people most likely to protest, it is indicated, are those making high salaries. Actually, they are not so important for census information on this point, and if they make more than $5,000, they may simply say so. A few in the trial census could not figure up what they earned, because they had worked so irregularly. Generally speaking, the data collected on wages and salaries are expected to yield valuable statistics. Needless to say, census answers are confidential. It is only the tables of facts and figures that become public.

How Many Wives?

Also new in the 1940 census will be certain questions on marriage and size of families. This time, the enumerator will ask adults how many times they have been married. Parents will be asked how many children they have ever had, including those who have died but excluding the still-born.

Never before has the census counted tombstones, so to speak. But scientists who specialize in population problems say that it is important for the United States' future to get the facts about American fertility.

Whether children are taken off by sickness or accidents is beside the point for this purpose. Those are losses which medical and safety campaigns may reduce.

But knowing the number of children produced will enable population scientists to figure more wisely whether immigration should be limited or encouraged, and whether America should encourage large families, which Italy and some countries do by taxing bachelors more heavily, for example.

Among new features of the census will be a survey of housing, taken in 25,000,000 homes. This will be particularly interesting to business men, who can profit by knowing how American homes are heated, how lighted, how many have running water, how the home is financed, and so on—a new game of "twenty questions" with a serious and useful purpose.

The censuses of population, housing, and agriculture will start April 1 and take about a month. April is a good time to find Americans at home.

The business census will start ringing doorbells of retailers, wholesalers, inn keepers, theater owners, and other business proprietors on January 2, and will spend six months at it.

How Rush Methods Work

These time-allowances for fact gathering may seem slow compared to stories you have heard about rapid foreign head counts. The Turks took their first census in 1927 in one huge day. But they did it by ordering people to stay at home, suspending business, stationing armed guards in the streets. At 10:15 p. m., guns announced that the census taking was over, and people could come out. The Soviet Union took its 1937 census in one day, but the schedule of only 14 questions required 1,200,000 workers. That would total somewhat less than three billion questions.

United States enumerators expect to ask seven billion questions in their round of inquiring about population, housing and agriculture.

Counting heads is a minor part of the 1940 census. Director of the Census William L. Austin has already forecast that the United States population will total around 132,000,000. It will be within a half million of that forecast, you can be sure.

Even the first United States census in 1790 was somewhat more than a count to find out how many people the country had. Taken for figuring Congressional representation, the census counted heads in the family, noting the number of free white males over and under sixteen; the free white females—tactfully no questions asked about age; other free persons, grouped together without distinction of sex; and the number of slaves. That was the enumerator's

THEY ARE COUNTED, TOO

This is a scene at the dress rehearsal census already completed in Indiana. America's trailer population creates a new task for the census takers.

whole battery of inquiries; in 1930, the number of questions was up to 30.

Overloading the schedule of questions is regarded by the government bureau as a real danger. Every item added, or left out, in revising the questionnaire is carefully judged. Many people urge the Census Bureau to include information they consider valuable. The Bureau has been asked to count dogs, fence posts, blonds and brunettes, and nursing mothers. None of these can be counted in 1940. Questions are chosen as having greatest usefulness for social and economic problems.

Handling the data that come piling into the Bureau when the harvest of questions is over, is a gigantic statistical project. The Census Bureau is proud owner of the largest battery of unit tabulating equipment possessed by any organization. One of its own employees invented the first machine to tabulate the census of 1890. The system of punching cards, so that they can be sorted according to the holes for tabulating and automatic totalling, is a triumph of machine work.

The Bureau likes to remind you that this machine work on the cards of the 1930 census was the equivalent of handling over 4,700,000,000 cards once.

Maybe that gives you an idea why the Bureau is so busy getting ready for the next, even bigger card crop, and also why it thinks twice and confers with government and business advisers before it decides to ask one more question.

Science News Letter, December 2, 1939

● RADIO

Dr. Dean R. Brimhall, assistant to the chairman of the Civil Aeronautics Authority, will describe the research on training of America's flyers of tomorrow as guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Monday, December 11, 3:35 p.m., EST, 2:35 CST, 1:35 MST, 12:35 PST. Listen in on your local station. Listen in each Monday.

MEDICINE

Pituitary Gland Failure Held To Be Cause of Sprue

A NEW theory of the cause of sprue, serious disease of the tropics which also occurs in the United States and other temperate regions, was announced by Dr. Edward B. Vedder, of George Washington Medical School, at the meeting of the American Society of Tropical Medicine in Memphis.

Sprue, Dr. Vedder believes, is caused by a failure of the tiny but powerful pituitary gland at the base of the brain. This little gland produces a number of hormones, among them one called prolactin which stimulates milk secretion, and which also has an effect on the digestive tract. It is lack of this hormone which Dr. Vedder believes causes sprue, and he would like physicians to try the hormone as a remedy for their sprue patients.

Most effective remedies for sprue at present are liver extract or some other source of the vitamin B_2 complex, but Dr. Vedder believes the gland hormone would prove a better remedy.

Sore mouth, anemia and digestive disorder are characteristic symptoms of sprue. The digestive disorders set up a vicious cycle, because the sprue patient already unable to absorb enough of the B vitamins, has more and more trouble getting enough of these vitamins which he needs to remedy his illness. In severe cases they must be given by hypodermic injections. A number of scientists have concluded that the digestive disorder and vitamin deficiency were important parts of the picture, but no satisfactory explanation for what starts the vicious cycle has hitherto been forthcoming.

The start of the digestive disorder, Dr. Vedder believes, is the failure of the anterior pituitary gland to produce enough prolactin to keep the digestive tract functioning smoothly. Tropical service, he suggests, precipitates the pituitary gland failure in some persons, but such gland failure may occur without the precipitating effect of long periods of tropical heat, which may explain the nearly 200 cases of non-tropical sprue in medical records.

Science News Letter, December 2, 1939

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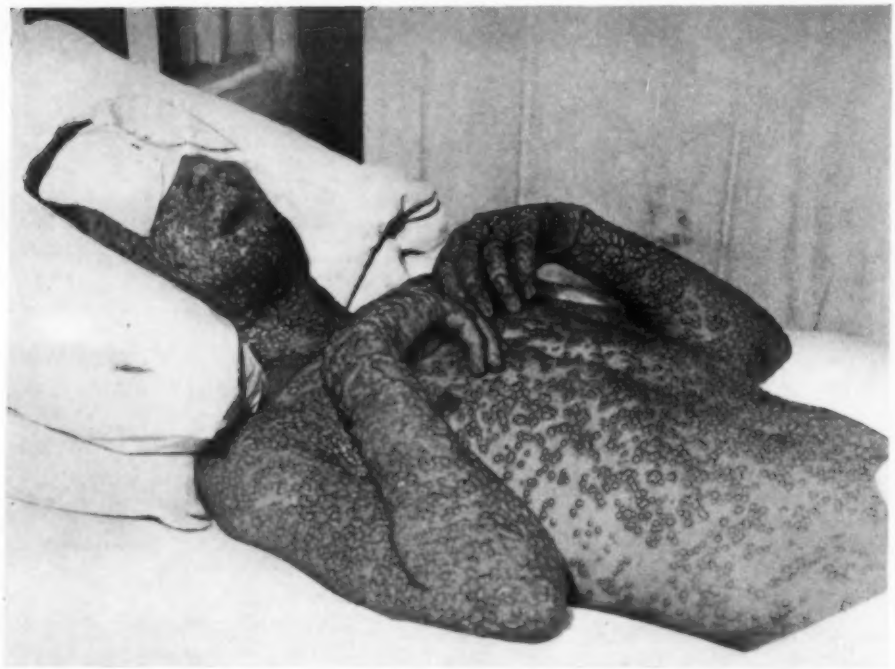

PRICE FOR NEGLECT

"This man was never vaccinated against smallpox," states the New York State Department of Health. The picture of the patient was taken by the health department's staff photographer on a day when the attending physician despaired of saving the patient's life. He had had a fever of 105 degrees Fahrenheit for a week, was unconscious most of the time, and roused only in delirium. The patient did recover—possibly due to sulfanilamide which was given on the day the picture was taken—but he will carry the ugly smallpox scars the rest of his life. The patient consented to the publication of this photograph in order that others might be saved.

MEDICINE

Warns Against Cleansing Skin With Agents That Irritate

Don't Use Turpentine, Alcohol, or Kerosene to Take Off Paint; Photographers' Hypo Called Safe

PAINFUL skin irritations and the consequent annual loss of thousands of dollars in time to industrial workers may result from use of many common cleansing agents for removing stains from the hands, Dr. Joseph V. Klauder, of Philadelphia, warned at the meeting in Philadelphia of the American Academy of Dermatology and Syphilology.

Turpentine, alcohol, naphtha, gasoline, kerosene, benzine, soda ash and hypochlorite of lime, commonly used to remove dye or paint stains, are important causes of industrial dermatitis or inflammation of the skin, he said. Harmless methods of cleansing the hands are just as efficient, but unfortunately many factories and workmen are uninformed or careless on this subject.

A 10% solution of sodium hyposulfite, commonly called "photographer's friend," was recommended as a harmless dye and stain remover. Dr. Klauder also advised using a brush instead of a cloth and a tool instead of the hand in applying paints, dyes and other chemicals.

"Prolonged contact of the hands with water or soap is harmful," Dr. Klauder warned housewives as well as industrial workers.

Science News Letter, December 2, 1939

Skin Disease from Brains

AN OVERSTIMULATED brain and nervous system may lead to skin disorders, Dr. Samuel W. Becker, of the University of Chicago, reported.

Persons with "high powered brains and hypersensitive nervous systems" have all their sensations intensified. This results in bodily and mental exhaustion which disturbs both the skin and other organs of the body including, sometimes, the brain itself. These people, unfortunately, do not possess a normal sense of fatigue to act as a brake for their nervous systems.

Highly significant, said Dr. Becker, is the fact that these functional disorders appear in man but not in other animals having half or less than half of man's brain tissues.

Science News Letter, December 2, 1939

Moles That Lead to Cancer

THE common mole, skin-colored or a little darker, "rarely, if ever, terminates in cancer," and blood vessel birthmarks and the dark brown, warty, hairy birthmarks are also relatively innocent of cancerous tendencies, Dr. Eugene F. Traub, of New York City, declared.

"The smooth, dark brown or dark blue marks, devoid of hair, are the ones that are most dangerous. It is from this type that melanoma (serious skin cancer) often develops," he said.

Skin cancers, Dr. Traub emphasized, are easy for the doctor to diagnose and generally can be cured by X-ray or radium treatment or surgical operation.

Science News Letter, December 2, 1939

War on Two More Plagues

THE war on disease needs to be extended to two more hush-hush plagues besides syphilis and gonorrhea.

These two types of venereal disease, lymphogranuloma and granuloma venereum by name, are little known to the public but are dangerous to the public health, Dr. Harold N. Cole, of Western Reserve University, Cleveland, told members of the Academy.

These two diseases are particularly widespread in the southern part of the United States, Dr. Cole said. So many persons are affected that some of the

● Earth Trembles

Information collected by Science Service from seismological observatories resulted in the location by the U. S. Coast and Geodetic Survey of the following preliminary epicenters:

Tuesday, November 21, 6:01 a.m., EST

About 600 miles off Cape Guardafui in northern part of Indian Ocean. Latitude, 10 degrees north. Longitude, 60 degrees east.

For stations cooperating with Science Service, the Coast and Geodetic Survey, and the Jesuit Seismological Association in reporting earthquakes recorded on their seismographs, see SNL, Oct. 28.

medical centers in the south are setting up special clinics for treating them.

"These diseases are not readily transferred from the sufferers to other persons by the use of drinking cups, kissing and towels, although granuloma venereum may be," Dr. Cole said. "Sexual relations do spread them rapidly though," he emphasized.

Science News Letter, December 2, 1939

Skin Diseases Predominate

SKIN diseases make up about three-fourths of all occupational diseases in the United States, causing millions of dollars loss in time and efficiency every year, Dr. Marion B. Sulzberger, of New York, declared.

Plants, drugs, cosmetics, textiles, wearing apparel, household articles, parasites, fungi and other agents all may cause occupational dermatitis or skin disease in those whose jobs bring them in contact with these objects. Physical and chemical agents such as dyes, may cause the condition by direct irritation of the skin, but trouble may also be caused in sensitive or allergic persons by substances which in most cases are innocuous.

The "hazards" of the patient's home and working place and even his intelligence and ability to follow treatment and his truthfulness in reporting his case history must be investigated, Dr. Sulzberger said, in order to make an accurate diagnosis and to prescribe effective treatment.

Science News Letter, December 2, 1939

INVENTION

Research Laboratories Announce Useful Finds

FROM industrial research laboratories: A new coating of alkyd resin for copper that keeps it bright and metallic when tested on the General Electric's New York World's Fair building.

Germ destruction by ultraviolet lamps that solves the problem of sanitary control of those paper hood-caps that milk bottles now wear.

Stainless steel serving trays, solid, corrosion-resistant, etched with beautiful designs.

Paints that tell how hot a machine part is becoming by changes in color.

Science News Letter, December 2, 1939

It is estimated that India has 1,500,000 blind and another 3,000,000 partially blind, and that at least half of this misery is due to preventable conditions.

PHYSICS

Use Flickering Beam To Probe Upper Atmosphere

"No Man's Land" of Atmosphere Below the Radio Reflecting Layers Explored With Distinctive Light

THE PIERCING, puzzling searchlight beam which mystified residents of northwest Washington last summer on moonless, dark and clear nights was explained at the meeting of the Philosophical Society of Washington by Ellis A. Johnson, of the Carnegie Institution of Washington.

No ordinary searchlight beam was that seen by Washingtonians. Its brilliant beam flickered ten times a second and identified it, for scientific research, so that its scattering at heights of as much as 24.8 miles could be detected.

The experiments, Mr. Johnson reported, seek to probe the upper atmosphere for its secrets of temperature, density, presence of clouds and other important information at heights which are beyond the reach of stratosphere flights with balloons.

Moreover, the new searchlight experiments tap that region of space lower than the radio reflecting layers in the ionosphere. The new technique thus investigates the "no man's land" of the atmosphere.

While the current experiments have been preliminary, seeking mostly to show the feasibility of the method, they indicate that studies can be carried out on the height of water vapor in the atmosphere, the amount of turbulence, the winds, dust, fluorescence and absorption of these upper altitudes up to nearly 20 miles. Actual measurements have

RUTHERFORD

by A. S. EVE

Foreword by EARL BALDWIN

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been carried out at this height and it was found that the beam itself could be detected up to 40 kilometers, or about 24.8 miles.

In outline the searchlight experiment is simple. The beam of a great searchlight was directed upward and made to flicker (modulate) about ten times a second by an automatic Venetian blind type of shutter.

Some three and a half miles away was placed a large mirror, containing at its focus a photoelectric cell. This mirror pivoted upward and caught light scattered from the beam in the sky. The photoelectric current generated by this scattered light was amplified in a special radio amplifier developed by Mr. Johnson, which is so sensitive that it can detect currents of only .000,000,000,000,000,032 amperes. From the geometry of the searchlight and the receiving mirror the altitudes at which the beam is studied can be calculated.

The modulated, flickering nature of the light makes it possible to differentiate it from the general background light of the night sky. Even so, it was necessary to work only on clear nights without moonlight and at times when there was little haze at low altitudes.

The experiments indicate that with a 60-inch searchlight and a 60-inch mirror as a receiver, the study of the upper atmosphere could be pushed to 90 kilometers, or nearly 56 miles.

A particularly useful problem which ought first be carried out, Mr. Johnson indicated, is to study the ozone found in the atmosphere. "Since ozone has a strong absorption band from 2,500 to 3,300 Angstrom units of wavelength," he said, "it would be possible to study the scattering from this region with the scattering from that above 3,400 Angstroms. This can be done by the use of two receivers using sodium and potassium photocells respectively."

Three other research problems, all vital for meteorology, appear to be feasible with the new type of equipment, Mr. Johnson explained.

1. The density and temperatures of the atmosphere at great heights can be determined, which should tie in with present studies deduced from the length, brilliance and heights of the flaming tails of meteors.

2. The ozone distribution in the air (which helps shield the earth from the sun's ultraviolet light rays) can be determined in the region below its maximum concentration around 12 to 15 miles altitude. There is some indication that this ozone is carried by the polar air currents, so that a knowledge of its concentration, eventually, might lead to a better knowledge of polar air currents which are known to influence world weather.

3. The method might also be used to disclose the presence of water vapor above 12 kilometers (7.4 miles). If appreciable water is present there it would provide a mechanism for the re-radiation of solar rays and hence be useful knowledge in meteorology.

Dr. E. O. Hulbert of the Naval Research Laboratory has made measurements in the region of the upper atmosphere studied by C.I.W.'s Department of Terrestrial Magnetism scientists who, besides Mr. Johnson, were R. C. Meyer, R. E. Hopkins and W. H. Mock.

Dr. Hulbert photographed the scattered light from the setting and rising sun at altitudes up to 20 kilometers (12.4 miles) and was able to detect scattering as high as 56 kilometers (35 miles). The new experiments by the searchlight beam extend actual measurements up to 32 kilometers (19.8 miles).

Science News Letter, December 2, 1939

For CHRISTMAS

a good book on science is a tribute as well as a gift

If you know no more of your friend than that he can eat, give him candy. If you know no more than that he can read, give him a book. But if you know that he can think, give him a book on science for that will be eating and reading and thinking and a heart-warming token of your high regard for him and his mind.

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BOTANY

NATURE RAMBLINGS

by Frank Thone

Versatile Rhus

ISN'T IT ODD, what divergences of qualities can be displayed by different species within a single plant genus!

Take the sumac family, for instance; the group of plant species which botanists know collectively as *Rhus*.

We are all familiar with the common smooth sumac, whose thickets along roadsides and on waste lands make splashes of gorgeous red as autumn days grow shorter. With its close relative the low sumac, which never grows more than about a third of its height, it is a favorite with planners of native shrub plantings in parks and on home grounds. It also offers shelter and food to many kinds of birds.

Choosing swampy lowlands instead of rather dry uplands is another close botanical cousin, the staghorn sumac. It looks very much like the ordinary sumac, except that its upper branches are covered with a thick, sooty-black fuzz, like the "velvet" on the immature antlers of a deer. This sumac is perhaps even more planted for horticultural purposes than its smooth-stemmed relative.

Looking very much like these harmless and desirable sumacs is one of the black sheep of the family, poison sumac. Its bark is smooth, but paler than that of the smooth sumac, but its fruits appear as drooping clusters of small, pallid white berries instead of the erect bunches of dark purple-brown "seeds" that mark the other sumacs. Fortunately for most of us, it grows only in boggy areas, so that if you want a "dose" of sumac poisoning you will most likely have to wet your feet to get it.

Not so inaccessible, alas, are those evil three-leaved twins of the sumac cousinship, poison ivy of the eastern half of the country and poison oak of the western mountains. They do not look like

sumacs at all, except to botanists who have the hardihood to examine their flowers and fruits carefully—but it is by these, and not by leaves, that botanical kinships are established.

Even less like the conventional notion of what a sumac should be are the single-leaved bush sumacs found abundantly on the Pacific slope, and represented also by other species in some parts of the interior. Some of these are so sour in leaves and fruit that they have earned the name "lemonade bush"—possibly from the use of their fruits by pioneers in making an acidulated beverage when lemons were an unobtainable luxury.

Science News Letter, December 2, 1939

PSYCHOLOGY

Propaganda Need Not Lie; May Succeed With Part Truths

This timely article is another of the series being released by the Society for the Psychological Study of Social Issues through Science Service. The SPSSI is a group of psychologists specializing in the field of social problems.

PROPAGANDA does not have to lie. Its success may depend not upon violation of the truth but upon failure to refer to facts pertinent to an opponent's case.

If an English, German, or domestic propagandist merely suppresses some of the facts in a situation, he will tend to make people agree with his point of view without distorting the facts he does present.

During the time of the first Japanese incursions into Manchukuo, an investigation which was planned by W. K. C. Chen at Columbia University was carried out at seven American universities.

Classroom instructors, while making no attempt to veil the character of the propaganda they were employing, slowly and emphatically recounted facts relative to the situation in Asia.

Some student groups were presented with authentic facts which had been organized by a Japanese publicist. In other classes facts had been organized by a Chinese publicist.

Each publicist had emphasized the sacrifices and investments his own country had made in Manchukuo. All of the facts were "true," but neither publicist mentioned the facts of his opponent.

Even though these student groups were well aware of the importance and effects of propaganda, it was shown that the mass of evidence from one side which had been presented to them affected their attitudes toward the role of Japan and China in Manchukuo.

Students hearing only the Japanese side moved very strongly and clearly in the pro-Japanese direction. Those hearing the Chinese summary of the facts became more pro-Chinese. After the experiment the student groups were shown on the blackboard how tremendously they had been influenced by this type of propaganda and general implications were discussed.

In this investigation it was also revealed that groups which were not subjected either to Japanese or Chinese propaganda did not change their attitudes, a finding which suggests that the groups whose attitudes shifted must have been affected by the presentation of the one-sided facts. Even a summary of the Manchukuo situation by an impartial source caused another group of students to revise their judgments.

This is one of a series of investigations which indicate clearly that awareness of the danger of propaganda does not prevent individuals from being affected when the simple device of leaving out half of the picture is utilized.

Science News Letter, December 2, 1939

PALEONTOLOGY

Fossil Found in Colorado 50 Million Years Old

FOSSIL remains of a hitherto unknown mammal that lived in Colorado 50 million years ago, and that looked like nothing now living on earth, have been brought back to the Field Museum of National History by an expedition under the leadership of Bryan Patterson.

The animal, found in a stratum of paleocene date, stood about three feet high, was six feet long, had thick legs and a generally heavy build. Its teeth indicate that it was a plant-eater. The group to which it belonged, long extinct, is known to paleontologists as the pantodonts.

Science News Letter, December 2, 1939

China is one of the largest wheat-growing nations.

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By GERALD WENDT

Director of Science, N. Y. World's Fair

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•First Glances at New Books

History

EUROPEAN CIVILIZATION—James Westfall Thompson, Franklin Charles Palm and John J. Van Nostrand—*Van Nostrand,* 1297 p., $8. A textbook covering 6,000 years of civilization, disposing of the ancient world in a couple of hundred pages and arriving at early modern history before the 600th page. This allows elbow room for the authors to analyze contemporary history and events leading up to it. Excellent maps and a good index add to the value of the history for reference use.

Science News Letter, December 2, 1939

Education

NEW YORK LEARNS—Federal Writers' Project—*Barrows,* 302 p., $1.50. One of the useful American Guide Series, this one devoted exclusively to the educational opportunities in this great cultural center.

Science News Letter, December 2, 1939

Ethnology

THE CULTURE HISTORICAL METHOD OF ETHNOLOGY — Wilhelm Schmidt; translated by S. A. Sieber—*Fortuny's,* 383 p., $5. An elaborate synthesis of ethnology as a historical science; of interest mainly to readers with sufficient knowledge of the subject to appraise its theories and schools of thought. Dr. Schmidt represents the Viennese school of ethnology.

Science News Letter, December 2, 1939

Electrical Engineering

THE PAGEANT OF ELECTRICITY—Alfred P. Morgan—*Appleton-Century,* 363 p., $3.50. Colorful history of the development of electrical science from the earliest times down to the present. Using narrative form, the author weaves a fascinating story around the lives and achievements of the men whose skill and curiosity have made electricity man's versatile servant.

Science News Letter, December 2, 1939

Chemistry

PIONEERS OF PLENTY, The Story of Chemurgy—Christy Borth—*Bobbs-Merrill,* 303 p., $3. A glowingly optimistic account of the chemurgic movement, and of the men who originated and are promoting it.

Science News Letter, December 2, 1939

Chemistry

SEMIMICRO QUALITATIVE ANALYSIS—Arthur R. Middleton and John W. Willard—*Prentice-Hall,* 446 p.,, $3.50. Purdue University text which has evolved during the last six years and which has been tried out successfully on large groups of students. The laboratory directions are precise and workable.

Science News Letter, December 2, 1939

Physics

THE AMPLIFICATION AND DISTRIBUTION OF SOUND—A. E. Greenlees—*Sherwood,* 254 p., $4. British book on the theory and application of sound, and sound amplifying systems.

Science News Letter, December 2, 1939

Photography

THE PHOTOGRAPHIC PROCESS — Julian Ellis Mack and Miles J. Martin—*McGraw-Hill,* 586 p., $5. The theory and scientific side of photography presented in a comprehensive, clear work suitable for use as a college textbook or reference volume.

Science News Letter, December 2, 1939

Biology

THE LITTORAL FAUNA OF GREAT BRITAIN, A Handbook for Collectors—N. B. Eales—*Cambridge (Macmillan),* 301 p., $3.50. It is to be sincerely hoped that the day will soon come when collectors, both native and visiting, can make unrestricted use of this interesting book along Britain's sea-washed rocks and sandy beaches.

Science News Letter, December 2, 1939

Forestry

THE MANAGEMENT OF FARM WOODLANDS—Cedric H. Guise—*McGraw-Hill,* 352 p., $3. Farm owners, even in parts of the country not naturally heavily timbered, are coming increasingly to the realization of the importance of trees as productive plants and are devoting parts of their holdings to timber cultivation. Prof. Guise's book will be found of equal value in the training of the oncoming generation of farmers and farm managers, and as a reference book for those already engaged in the creation or handling of farm timber lots.

Science News Letter, December 2, 1939

General Science—Juvenile

THE LADDER OF CLOUDS, 44 p.; THE BOOK OF STONES, 33 p.; SNOW, GLACIERS AND ICEBERGS, 43 p.—Federal Writers' Project—*Albert Whitman,* 50c. each. Using the simple narrative method, each of these three small books explains one major natural phenomenon, in terms suitable for readers in the lower grades.

Science News Letter, December 2, 1939

Geography

THE THRONE OF THE GODS, An Account of the First Swiss Expedition to the Himalayas—Arnold Heim and August Gansser; translated by Eden and Cedar Paul—*Macmillan,* 233 p., $5. When men from Switzerland leave home in order to climb mountains, it must mean that they have found some mountains worthy of their attention. The writers of this book make it abundantly evident that they did just that, and they back up their expertly competent judgment with a couple of hundred photographs that are nothing short of marvellous.

Science News Letter, December 2, 1939

Electrical Engineering

A. S. T. M. STANDARDS ON ELECTRICAL INSULATING MATERIALS — *American Society for Testing Materials,* 309 p., $2.

Science News Letter, December 2, 1939

Entomology

THE BUTTERFLIES OF THE NIAGARA FRONTIER REGION AND BEGINNER'S GUIDE FOR COLLECTING, REARING AND PRESERVING THEM — William Wild — *Buffalo Museum of Science Press,* 39 p., 8 pl., $1. Butterflies are attractive objects for the beginning collector, but perhaps a little difficult to handle. This manual helps both in identification and in correct pinning-out and preservation.

Science News Letter, December 2, 1939

Documentation

PROCEEDINGS, THIRTY-FIRST ANNUAL CONFERENCE SPECIAL LIBRARIES ASSOCIATION, Lord Baltimore Hotel, Baltimore, Maryland, May 23-27, 1939 — *Special Libraries Assoc.,* 163 p., $2; to members, $1. Of great interest to librarians, especially those who were not able to attend this conference.

Science News Letter, December 2, 1939

Psychology—Physics

THE PSYCHOLOGY OF PHYSICS—Blamey Stevens—*Sherratt & Hughes; American agent, Stechert,* 282 p., $2.

Science News Letter, December 2, 1939

Law

LAW, THE STATE, AND THE INTERNATIONAL COMMUNITY—James Brown Scott —*Columbia Univ. Press,* 2 Vol., 1014 p., $8.75.

Science News Letter, December 2, 1939

Technology

MODERN PLASTICS, Catalog, Directory, October 1939—*Breskin Pub. Co.,* 454 p., $2.

Science News Letter, December 2, 1939